

**Claims**

1. A power generator for mounting inside a pneumatic tyre, the power generator including a piezoelectric element, an actuating mass arranged for contact with the piezoelectric element and control circuitry in electrical communication with the piezoelectric element,  
5 in which the actuating mass is arranged to deflect the piezoelectric element in response to external forces acting on the actuating mass in use to generate an electrical charge, characterised in that the control circuitry forms at least part of the actuating mass.
2. A power generator as claimed in claim 1, in which the power generator includes a housing for the piezoelectric element, actuating mass and control circuitry, the housing  
10 being adapted to be mounted within a pneumatic tyre.
3. A power generator as claimed in claim 2, in which an exterior surface of the housing has a substantially arcuate profile adapted for bonding to an arcuate interior surface of a vehicle tyre.
4. A power generator as claimed in claim 2 or 3, in which an exterior surface of the  
15 housing includes an external profile for complimentary engagement with the internal pattern of a vehicle tyre.
5. A power generator as claimed in claim 2, in which the housing is releasably mounted on a footing adapted to be bonded to the internal wall of a tyre.
6. A power generator as claimed in claim 5, in which the housing is releasably mounted on  
20 the footing by means of clips.
7. A power generator as claimed in claim 5 or 6, in which the footing includes air channels for allowing movement of air about the housing, in use.

8. A power generator as claimed in any of claims 2 to 7, in which the maximum deflection of the piezoelectric element under action of the actuating mass is limited by a portion of the housing.
9. A power generator as claimed in any of claims 2 to 8, in which the housing includes a  
5 base wall, and the piezoelectric element is supported on the housing with a central region of the element spaced apart from the base wall, and in which the base wall serves to limit the maximum deflection of the piezoelectric element.
10. A power generator as claimed in any preceding claim, in which the piezoelectric element is in the form of a piezoceramic disc.
- 10 11. A power generator as claimed in claim 10, in which the piezoceramic disc has a radius  $R$ , and is mounted on a supporting disc having a radius greater than  $R$ .
12. A power generator as claimed in any of claims 2 to 11, in which the actuating mass includes an actuator movably mounted in the housing and adapted for contact with the piezoelectric element.
- 15 13. A power generator as claimed in claim 12, in which the actuator includes a projection, provided for contact with the piezoelectric element.
14. A power generator as claimed in claim 13, in which the projection is elongate.
15. A power generator as claimed in claim 13 or 14, in which the projection contacts a central region of the piezoelectric element.
- 20 16. A power generator as claimed in any of claims 13 to 15, when dependent upon claim 11, in which the projection is arranged for diametrical contact with the disc.

17. A power generator as claimed in any of claims 12 to 16, in which the control circuitry is mounted on the actuator.
18. A power generator as claimed in any of claims claim 12 to 16, in which the housing includes a cap adapted for movement with the actuator, and in which the control  
5 circuitry is mounted on the cap.
19. A power generator as claimed in any preceding claim, in which the actuating mass is arranged in the housing for contact with the piezoelectric element under centrifugal forces.
20. A power generator as claimed in any preceding claim, in which the control circuitry is  
10 encased in a potting compound which also contributes to the actuating mass.
21. A power generator as claimed in any preceding claim, in which the control circuitry includes sensor circuitry for monitoring environment parameters local to the housing.
22. A power generator as claimed in any previous claim, in which the power generator forms part of a telemetry unit and the control circuitry includes sensor circuitry for  
15 monitoring environment parameters local to the unit.
23. A power generator as claimed in any previous claim, in which the control circuitry includes a low power consumption protocol, for minimising consumption of the generated power.
24. A power generator substantially as herein described and as illustrated in Figures 1 to 5  
20 and 6 to 11.